

What we **claim** is:

- Sub C8
1. A method for making an *in situ* analytical diagnosis of biological tissue and cells of living organisms comprised of:
 - a) applying to the tissue or cells a biological stain or dye or a combination of biological stains and dyes and
 - b) measuring and recording the reflected light spectrum of the stained tissue or cells by means of illuminating the stained tissue or cells with light and directing the reflected light to a suitable spectrometer and
 - c) comparing and correlating the reflected spectrum of the stained or dyed tissue or cells with previously obtained spectrum.
 2. A method as in Claim 1 where the biological stain or dye is one or a combination of more than one of biological stain or dye.
 3. A method as in Claim 1 where the biological stain or dye is a metachromatic biological stain or dye.
 4. A method as in Claim 1 where the biological stain or dye is a combination of biological stains or dyes of which at least one component is a metachromatic biological stain or dye.
 - Sub C9
5. A method as in Claim 1 where the spectrum from the tissue or cells stained or dyed is compared to a database file of spectrums or composite of spectrums by software means and the use of a digital microprocessor.
 6. A method as in Claim 5 where the database file of spectrums are from tissue or cells similarly stained and subsequently analyzed and classified by means of conventional histochemical and biochemical techniques.

Sub C¹⁰

7. A method as in Claim 1 where the tissues or cells are thought to be diseased, metaplastic, or otherwise abnormal.

8. A method as in Claim 1 where the spectrometer is able to measure light for a range or some part of a range of wavelength from 200 to 1100 nanometers.

9. A method as in Claim 1 where the reflected light spectrum is measured and recorded by means of a photometer and one or more light filters.

10. A method as in Claim 1 where the tissues or cells are of organs including, but not limited to the skin, cervix, vaginal, mouth, colon, and esophagus or internal organs.

11. A method as in Claim 5 where the spectrum of normal unstained tissue or cells is first subtracted from the spectrum of the stained tissue or cells.

~~12.~~ A method for making an in situ analysis of biological tissue and cells of living organisms comprised of:

- a) applying to the tissue or cells a photo-reactive biological stain or dye, or a combination of photo-reactive biological stains or dyes, and
- b) illuminating the stained tissue or cells with light while simultaneously measuring and recording the changes of the reflected light spectrum of the stained tissue or cells and
- c) correlating the change in the reflected light spectrum of the photo-reactive biological stain or dye composition as a cytochemical or histochemical property of a particular type of tissue or cells.

~~13.~~ A method for the cytotoxic destruction of dysplastic, pre-cancerous or cancerous cells and tissues by means of

- a) applying to the tissue or cells a biological stain or dye or a combination of biological stains and dyes as a photosensitizer and

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- b) irradiating the stained tissue or cells with light of a suitable and sufficient intensity and quality to induce photo oxidation of the biological stain or dye and
 - c) simultaneously monitoring the change of the reflected spectrum of the stained or dyed tissue or cells during photo irradiation.

14. A method as in Claim 13 where the biological stain or dye is one or a combination of more than one biological stain or dye.

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15. A method as in Claim 13 where the biological stain or dye is a metachromatic biological stain or dye.

16. A method as in Claim 13 where the biological stain or dye is a combination of biological stains or dyes of which at least one component is a metachromatic biological stain or dye.

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17. A method as in Claim 13 where the spectrometer is able to measure light for a range or some part of a range of wavelength from 200 to 1100 nanometers.

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18. A method as in Claim 13 where the reflected light spectrum is measured and recorded by means of a photometer and one or more light filters.

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19. A method as in Claim 13 where the tissues or cells are of organs including, but not limited to the skin, cervix, vaginal, mouth, colon, and esophagus, or internal organs.